PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-032666

(43)Date of publication of application : 31.01.2003

---

(51)Int.Cl. H04N 7/18
H03M 7/30
H04N 5/915
H04N 5/92
H04N 7/32

---

(21)Application number : 2001-215150 (71)Applicant : MATSUSHITA ELECTRIC IND CO LTD

(22)Date of filing : 16.07.2001 (72)Inventor : KOBAYASHI HIROTOSHI
INOUE SHUJI

---

(54) IMAGE PROCESSOR AND IMAGE PROCESSING METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an image processor and image processing method for efficiently compressing an image signal obtained by multiplexing a plurality of input moving images by using the correlativeness of adjacent pixels.

SOLUTION: This image processor is provided with a synchronizing signal generating part 111 for acquiring the synchronization of processing, a camera switching part 109 for switching a plurality of input image signals based on a vertical synchronizing signal generated by a synchronizing signal generating part 111, a division processing part 110

for dividing the switched image signals for each frame (or field), a smoothing processing part 112 for suppressing the high frequency components of the image signals outputted by the division processing part 110, a synthesis processing part 113 for re-constituting the frame(or field) by combining the divided images outputted by the smoothing processing part 112 with the divided images of another frame (or field), and a compression encoding part 114 for executing the inter-frame compression of the re-constituted image signals. Thus, the compressing efficiency of even the moving image signals without any inter-frame correlation can be increased by generating the correlation.

LEGAL STATUS [Date of request for examination]
[Date of sending the examiner's decision of rejection]
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of rejection]
[Date of extinction of right]

CLAIMS

[Claim(s)]

[Claim 1] The synchronizing signal generating section which generates the synchronizing signal for taking the synchronization of processing, and the change-over section which switches two or more input picture signals based on the synchronizing signal generated in said synchronizing signal generating section, The division processing section which divides 1 screen unit of said switched picture signal into plurality, The data-smoothing section which smooths the data of said picture signal outputted from this division processing section, and stops a high frequency component, The image processing system characterized by having the synthetic processing section which reconfigurates 1 new screen unit combining the image with which other 1 screen units were

divided in the image outputted and divided from this data-smoothing section, and the compression coding section which compresses between screens the picture signal reconfigurated by this synthetic processing section.

[Claim 2] The image processing system according to claim 1 characterized by having the Records Department which records the signal encoded by said compression coding section.

[Claim 3] The image processing system according to claim 1 characterized by having the network interface section for transmitting the signal encoded by said compression coding section.

[Claim 4] The image processing system according to claim 1 characterized by having the pixel amendment section which amends the pixel of the picture signals divided in said division processing section, and is outputted to said synthetic processing section.

[Claim 5] The image processing system according to claim 1 with which it has the input section which outputs the control signal which controls the sequence which switches said input picture signal to said change-over section and said compression coding section, and said compression coding section is characterized by multiplexing the control signal outputted to the picture signal

outputted from said synthetic processing section from said input section.

[Claim 6] The image processing system according to claim 5 characterized by having the Records Department which records the signal encoded by said compression coding section.

[Claim 7] The image processing system according to claim 5 characterized by having the network interface section for transmitting the signal encoded by said compression coding section.

[Claim 8] The image processing system according to claim 5 characterized by having the Records Department which records the signal encoded by said compression coding section and said control signal as incidental information.

[Claim 9] The image processing system according to claim 5 characterized by having the network interface section for transmitting the signal encoded by said compression coding section and said control signal as incidental information.

[Claim 10] The decode section which decodes the encoded picture signal, and the separation processing section which divides into plurality 1 screen unit of the picture signal decoded in this decode section, The image processing system characterized by having the reverse data-smoothing section which restores the high frequency component of the picture signal divided into this separation

processing section, and the restoration processing section which compounds with the picture signal which separated the picture signal restored to this reverse data-smoothing section from the picture signal of other 1 screen units, and returns the list of a pixel.

[Claim 11] The image processing system according to claim 10 characterized by having the amendment return section which returns amendment of a pixel to the picture signal outputted from said reverse data-smoothing section, compounding with the picture signal with which said restoration processing section separated the signal outputted from said amendment return section from the picture signal of other 1 screen units, and restoring an image.

[Claim 12] The image processing system according to claim 10 characterized by outputting said picture signal based on the control signal which said decode section extracted [said output section] by having the output section which outputs the picture signal outputted from said restoration processing section, and said decode section's decoding said coded signal, and extracting a control signal.

[Claim 13] With the Records Department which outputs said coded-image signal based on the incidental information on the recorded coded signal It has the

output section which outputs the picture signal outputted from said restoration processing section. The image processing system according to claim 10 characterized by outputting said picture signal based on the control signal which said decode section extracted [said output section] by extracting a control signal while said decode section decodes the coded-image signal outputted from said Records Department.

[Claim 14] The image processing system according to claim 10 characterized by to output said picture signal based on the control signal which said decode section extracted [said output section] by having the network interface section which incorporates a coded signal using the incidental information to transmit, and the output section which outputs the picture signal outputted from said restoration processing section, and extracting a control signal while said decode section decodes the coded signal outputted from said network interface section.

[Claim 15] The change-over step which switches two or more input picture signals to time series, and multiplexes them based on a Vertical Synchronizing signal, The division step which divides a screen into plurality by carrying out subsampling of the 1 screen unit of the picture signal multiplexed to said time series, The smooth step which smooths the data of said picture signal divided at

said division step, and stops a high frequency component, The image-processing approach characterized by consisting of a synthetic step which reconfigurates 1 new screen unit combining the image which carried out subsampling of the picture signal of two or more of said 1 screen units, and divided it, and is arranged in time series, and a compression step which compresses said reconfigurated picture signal between screens.

[Claim 16] The image-processing approach characterized by to have the decode step which decodes the encoded picture signal, the separation step which divides said 1 decoded screen unit of a picture signal into plurality, the reverse smooth step which restore said separated high frequency component of a picture signal, and the restoration step which compound with the picture signal which separated said restored picture signal from the picture signal of other 1 screen units, and return the list of a pixel.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the image processing system and approach of performing record of two or more input video signals which used the dynamic-image compression encoder represented by MPEG 2 (ISO/IEC 13818-2), and transmission.

[0002]

[Description of the Prior Art] Record of the monitoring system using two or more

TV cameras and transmission are switched and put in practical use by coincidence or the frame switcher for every fixed time amount by carrying out frame composition of those images.

[0003] Fig. 17 is a block diagram of the conventional image monitor record regenerative apparatus. The picture signal from four cameras 1701, 1702, 1703, and 1704 is switched to every field (or frame) in the camera change-over section 1705 based on the Vertical Synchronizing signal from the synchronizing signal generating section 1707, and is inputted into the compression coding section 1706. The compression coding section 1706 performs compression coding processing for the inputted picture signal in every field (or frame).

[0004] The signal by which compression coding was carried out goes into the expanding decode section 1710, and based on the synchronizing signal of the synchronizing signal generating section 1712, expanding decode is carried out and it is inputted at the output section 1711. The picture signal inputted into the output section 1711 is outputted to a display 1713 only in the specific image chosen by the selection signal, and is displayed by the display 1713.

[0005] Compression methods in a frame, such as a JPEG coding method, are used for the compression expanding method used in said compression coding

section 1706 and the expanding decode section 1710.

[0006] There are some which were indicated by JP,8-242446,A as a conventional example which used inter-frame compression of MPEG etc. for compression processing of a static image. This example divided the static image by the subsample, and has used for and compressed the functionality of the pixel which the original image adjoins by arranging them in time series.

[0007]

[Problem(s) to be Solved by the Invention] However, with such a conventional image processing system, since inter-frame functionality was not acquired, the picture signal outputted from the frame change-over section of the monitoring system which records the image from two or more cameras on one set of a timelapse VTR etc. had the problem that the efficient compression effectiveness could not be acquired, by the dynamic-image compression coding method by MPEG 2 etc.

[0008] Moreover, when compression mode of processing of said conventional static image was used, there was a problem that the inclination for the energy of the high frequency component of the image after subsampling to increase was strong, and the compressibility of the compression image in a frame in an MPEG

compression method (I picture) fell.

[0009] This invention was made in order to solve such a problem, and it offers the image processing system which realizes efficient compression by inter-frame compression of MPEG etc. in the monitoring system which records and transmits the image from two or more cameras.

[0010]

[Means for Solving the Problem] The synchronizing signal generating section which generates a synchronizing signal for the image processing system of this invention to take the synchronization of processing, The change-over section which switches two or more input picture signals based on the synchronizing signal generated in said synchronizing signal generating section, The division processing section which divides 1 screen unit of said switched picture signal into plurality, The data-smoothing section which smooths the data of said picture signal outputted from this division processing section, and stops a high frequency component, It has the configuration characterized by having the synthetic processing section which reconfigurates 1 new screen unit combining the image with which other 1 screen units were divided in the image outputted and divided from this data-smoothing section, and the compression coding

section which compresses between screens the picture signal reconfigurated by this synthetic processing section.

[0011] By subsampling's dividing a frame or a field image, considering as two or more frames or field images by this configuration, and applying a frequency band limit by data smoothing after division processing Even if it is a picture signal without inter-frame correlation of the inputted picture signal, spatial correlation is transposed to correlation between a frame or the fields. Functionality can be given, data smoothing can restrict high frequency component energy further, it can high-compress by inter-frame compression of an MPEG compression method etc., and prolonged record can also be realized.

[0012] Moreover, it has the configuration characterized by equipping the image processing system of this invention with the Records Department which records the signal encoded by said compression coding section. By this configuration, the picture signal multiplexed with this image processing system can be recorded.

[0013] Moreover, it has the configuration characterized by equipping the image processing system of this invention with the network interface section for transmitting the signal encoded by said compression coding section. By this

configuration, the picture signal multiplexed with this image processing system can be transmitted to a remote place, and monitor of an image and record can be performed in a remote place.

[0014] Moreover, the image processing system of this invention amends the pixel of the picture signals divided in said division processing section, and has the configuration characterized by having the pixel amendment section outputted to said synthetic processing section. A gap of the pixel of the divided images can be amended and strength and compressibility can be made for the functionality between a frame or the field to improve by this configuration.

[0015] Moreover, the image processing system of this invention is equipped with the input section which outputs the control signal which controls the sequence which switches said input picture signal to said change-over section and said compression coding section, and it has the configuration said whose compression coding section was characterized by multiplexing the control signal outputted to the picture signal outputted from said synthetic processing section from said input section.

[0016] By this configuration, while being able to process only a specific input signal, control information can be added to the processed picture signal.

[0017] Moreover, it has the configuration characterized by equipping the image processing system of this invention with the Records Department which records the signal encoded by said compression coding section. The picture signal multiplexed by this configuration when only a specific input signal was processed can be recorded.

[0018] Moreover, it has the configuration characterized by equipping the image processing system of this invention with the network interface section for transmitting the signal encoded by said compression coding section. It is not necessary to pass the information for a control signal as another frame, and the coded signal which added the control signal, without lowering transmission efficiency can be transmitted by this configuration.

[0019] Moreover, it has the configuration characterized by equipping the image processing system of this invention with the Records Department which records the signal encoded by said compression coding section and said control signal as incidental information. The combination of an input signal can be checked without processing the recorded coded signal by this configuration.

[0020] Moreover, it has the configuration characterized by equipping the image processing system of this invention with the network interface section for

transmitting the signal encoded by said compression coding section and said control signal as incidental information.

[0021] The combination of the input signal under transmission can be checked by this configuration, without processing a coded signal, and only a coded signal including an input signal to transmit can be transmitted with incidental information.

[0022] Furthermore, the decode section in which the image processing system of this invention decodes the encoded picture signal, The separation processing section which divides into plurality 1 screen unit of the picture signal decoded in this decode section, It has the configuration characterized by having the reverse data-smoothing section which restores the high frequency component of the picture signal divided into this separation processing section, and the restoration processing section which compounds with the picture signal which separated the picture signal restored to this reverse data-smoothing section from the picture signal of other 1 screen units, and returns the list of a pixel.

[0023] Even if it is a picture signal without inter-frame correlation of the original picture signal by this configuration, it will decode as a picture signal high-compressed by inter-frame compression, and can restore to a picture signal

without the original inter-frame correlation.

[0024] Moreover, the image processing system of this invention is equipped with the amendment return section which returns amendment of a pixel to the picture signal outputted from said reverse data-smoothing section, and has the configuration characterized by compounding with the picture signal with which said restoration processing section separated the signal outputted from said amendment return section from the picture signal of other 1 screen units, and restoring an image. Even if amendment of a pixel is performed to the picture signal by this configuration, it can restore to origin.

[0025] Moreover, it has the output section which outputs the picture signal outputted from said restoration processing section, and said decode section decodes said coded signal, and extracts a control signal, and the image processing system of this invention has the configuration in which said output section considered as the description outputting said picture signal based on the control signal which said decode section extracted. Only the specific information which could process the picture signal with which the control signal was added, and was controlled by this configuration can be decoded.

[0026] With moreover, the Records Department which outputs said coded-image

signal based on the incidental information on a coded signal that the image processing system of this invention was recorded It has the output section which outputs the picture signal outputted from said restoration processing section. While said decode section decodes the coded-image signal outputted from said Records Department, a control signal is extracted, and said output section has the configuration characterized by outputting said picture signal based on the control signal which said decode section extracted. By this configuration, incidental information can extract only required information, only required decode processing can be performed, and the increase in efficiency of processing can be attained.

[0027] Moreover, the network interface section which incorporates a coded signal using the incidental information which transmits the image processing system of this invention, It has the output section which outputs the picture signal outputted from said restoration processing section. While said decode section decodes the coded signal outputted from said network interface section, a control signal is extracted, and said output section has the configuration characterized by outputting said picture signal based on the control signal which said decode section extracted. This configuration can receive a picture signal

from a remote place, and a control signal can perform only processing of a specific picture signal.

[0028] Furthermore, the change-over step which the image-processing approach of this invention switches two or more input picture signals to time series based on a Vertical Synchronizing signal, and is multiplexed, The division step which divides a screen into plurality by carrying out subsampling of the 1 screen unit of the picture signal multiplexed to said time series, The smooth step which smooths the data of said picture signal divided at said division step, and stops a high frequency component, One new screen unit is reconfigurated combining the image which carried out subsampling of the picture signal of two or more of said 1 screen units, and divided it, and it is characterized by consisting of a synthetic step arranged in time series, and a compression step which compresses said reconfigurated picture signal between screens.

[0029] By subsampling's dividing a frame or a field image, considering as two or more frames or field images by this approach, and applying a frequency band limit by data smoothing after division processing Even if it is a picture signal without inter-frame correlation of the inputted picture signal, spatial correlation is transposed to correlation between a frame or the fields. Functionality can be

given, data smoothing can restrict high frequency component energy further, it can high-compress by inter-frame compression of an MPEG compression method etc., and prolonged record can also be realized.

[0030] Moreover, the image-processing approach of this invention is characterized by to have the decode step which decodes the encoded picture signal, the separation step which divide said 1 decoded screen unit of a picture signal into plurality, the reverse smooth step which restore said high frequency component of a picture signal which separated, and the restoration step which compound with the picture signal which separated said restored picture signal from the picture signal of other 1 screen units, and return the list of a pixel.

[0031] Even if it is a picture signal without inter-frame correlation of the original picture signal by this approach, it will decode as a picture signal high-compressed by inter-frame compression, and can restore to a picture signal without the original inter-frame correlation.

[0032]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained using a drawing.

[0033] The block diagram of the image processing system in the gestalt of

operation of the 1st of this invention is shown in drawing 1 . The image processing system of this invention is equipped with the camera change-over section 109, the division processing section 110, the synchronizing signal generating section 111, the data-smoothing section 112, the synthetic processing section 113, and the compression coding section 114 as shown in drawing 1 .

[0034] The camera change-over section 109 is synchronized with the synchronizing signal which inputted each picture signal which inputs a picture signal, respectively and inputted it from the camera from a camera 101 to a camera 108 from the synchronizing signal generating section 111, is switched in order to every frame (or field), and outputs an image to the division processing section 110.

[0035] What synchronized with the external synchronizing signal inputted from one picture signal not only in the signal generated in self-excitation but the camera to input or the outside is sufficient as the synchronizing signal outputted from the synchronizing signal generating section 111.

[0036] The division processing section 110 outputs the image which divided each frame (or field) in the fixed number of frames (or field), and divided the

inputted picture signal to the data-smoothing section 112. The data-smoothing section 112 smooths the data of the picture signal inputted by specific matrix operation, and outputs it to the synthetic processing section 113.

[0037] The synthetic processing section 113 reconfigurates a frame (or field) combining the image with which other frames (or field) divided the inputted division image, and outputs it to the compression coding section 114. By the MPEG compression method, the compression coding section 114 carries out compression coding, and outputs the inputted picture signal.

[0038] In this configuration, in the data-smoothing section 112 being located in the latter part of the division processing section 110, a high frequency component can be effectively controlled to the image after division rather than it is located in the preceding paragraph.

[0039] The division composition approach of the picture signal in said image processing system is explained referring to drawing 2 . The approach for the input picture signal of said synthetic processing section 113 to rearrange in the approach of division of a frame (or field) image and the center, and rearrange [the picture signal inputted into said division processing section 110 from said camera change-over section 109 is shown in the maximum upper case, and] the

synthetic approach of a screen and a frame (or field) into the bottom of it under it is shown.

[0040] The division processing section 110 processes the inputted picture signal per four frames (or field). Grouping of the combination is carried out to two as (A, B, C, D), and (E, F, G, H). Each frame (or field) image is divided into the block of 2x2, and let the partial image which collected the pixels of the same location of a block be a subsampling image. the subsampling image outputted from the division processing section 110 -- the data-smoothing section 112 -- a passage -- the synthetic processing section 113 -- inputting . The subsampling image inputted into the synthetic processing section 113 is put in order by time series combining the subsampling image of other frames (or field) which make a group the same. Sequence is changed so that the same combination from which sampling time is different so that it may become A9, and (B10, C11, D12) in the back [for example / (A1, B-2, C3, D4) / still] may be continued and put in order.

[0041] According to the division composition approach which starts this operation gestalt as mentioned above, also in the case of a dynamic-image signal without correlation between frames (or field), correlation can be generated by carrying out the subsample of two or more frame (or field) images,

compounding them, and arranging to time series.

[0042] The block diagram of the image processing system in the gestalt of operation of the 2nd of this invention is shown in drawing 3 . As shown in drawing 3 , the image processing system of the gestalt of this operation is equipped with the camera change-over section 109, the division processing section 110, the synchronizing signal generating section 111, the data-smoothing section 112, the synthetic processing section 113, the compression coding section 114, and the Records Department 315, and the camera change-over section 109 - the compression coding section 114 are the same as that of the operation gestalt of the above 1st.

[0043] The Records Department 315 records the coded signal outputted from the compression coding section 114. Therefore, the picture signal processed with the image processing system is recordable.

[0044] The block diagram of the image processing system in the gestalt of operation of the 3rd of this invention is shown in drawing 4 . As shown in drawing 4 , the image processing system of the gestalt of this operation is equipped with the camera change-over section 109, the division processing section 110, the synchronizing signal generating section 111, the data-smoothing section 112,

the synthetic processing section 113, the compression coding section 114, and the network interface section 416, the camera change-over section 109 - the compression coding section 114 are the same as that of the operation gestalt of the above 1st, and the Records Department 315 of the operation gestalt of the above 2nd is replaced to the network interface section 416.

[0045] The coded signal outputted from the compression coding section 114 is transmitted to digital channels, such as ISDN or LAN, through the network interface section 416. Thereby in a remote place, the image multiplexed with this image processing system can be supervised or recorded.

[0046] The block diagram of the image processing system in the gestalt of operation of the 4th of this invention is shown in drawing 5 . As shown to drawing 5 , the image processing system of the gestalt of this operation has the camera change-over section 109, the division processing section 110, the synchronizing signal generating section 111, the data-smoothing section 112, the synthetic processing section 113, the compression coding section 114, and the pixel amendment section 517, it is as the same as the operation gestalt of the above 1st, and the camera change-over section 109 - the compression coding section 114 add the pixel amendment section 517 between the division processing

section 110 and the data-smoothing section 112.

[0047] The pixel amendment section 517 performs filtering by interpolation. A gap of the pixel of the images divided in the division processing section 110 by this configuration can be amended, and the functionality between frames (or field) can be strengthened.

[0048] The block diagram of the image processing system in the gestalt of operation of the 5th of this invention is shown in drawing 6 . The image processing system of the gestalt of this operation is equipped with the camera change-over section 109, the division processing section 110, the synchronizing signal generating section 111, the data-smoothing section 112, the synthetic processing section 113, the compression coding section 114, and the input section 618, the camera change-over section 109 - the compression coding section 114 are the same as that of the operation gestalt of the above 1st, and as shown in drawing 6 , since it has become with the configuration added in the input section 618, only this part explains.

[0049] The camera change-over section 109 switches cameras 101-108 with the camera selection signal inputted through the input section 618 from the exterior. Multiplex [of the camera selection signal outputted to coincidence also at the

compression coding section 114] is carried out to a coded signal as information which shows the combination of the cameras 101-108 compounded in the synthetic processing section 113.

[0050] If the abnormality situation occurs in a monitor application, the image which is photoing it will become important. According to the image processing system concerning this operation gestalt, an abnormal condition can be detected by a certain approach, and the information on a specific camera can be preferentially acquired in inputting into the input section 618 the camera selection signal created by it.

[0051] Moreover, by carrying out multiplex to a coding stream by a certain approach of using the user bit in the coding stream which carried out MPEG compression in the compression coding section 114, information on this selection signal is not needed other than a stream, but information can be added, without making the amount of signs increase.

[0052] The block diagram of the image processing system in the gestalt of operation of the 6th of this invention is shown in drawing 7 . As shown in drawing 7 , the image processing system of the gestalt of this operation is equipped with the camera change-over section 109, the division processing section 110, the

synchronizing signal generating section 111, the data-smoothing section 112, the synthetic processing section 113, the compression coding section 114, the Records Department 315, and the input section 618, and adds the Records Department 315 of the image processing system shown in the image processing system shown in the 5th operation gestalt at the 2nd operation gestalt.

[0053] By this configuration, even if it adds the function which switches cameras 101-108, it is not necessary to secure the field for a control signal in a record section, and many coded signals can be recorded.

[0054] The block diagram of the image processing system in the gestalt of operation of the 7th of this invention is shown in drawing 8 . As shown in drawing 8 , the image processing system of the gestalt of this operation is equipped with the camera change-over section 109, the division processing section 110, the synchronizing signal generating section 111, the data-smoothing section 112, the synthetic processing section 113, the compression coding section 114, the network interface section 416, and the input section 618, and transposes them to the network interface section 416 of the image processing system which showed the Records Department 315 of the image processing system shown in the 6th operation gestalt to the 3rd operation gestalt.

[0055] By this configuration, it is not necessary to pass the information on the sake for control signals as another frame, a camera switch function can be added, without lowering transmission efficiency, and a coded signal can be transmitted.

[0056] The block diagram of the image processing system in the gestalt of operation of the 8th of this invention is shown in drawing 9 . As shown in drawing 9 , the image processing system of the gestalt of this operation In the image processing system which was equipped with the camera change-over section 109, the division processing section 110, the synchronizing signal generating section 111, the data-smoothing section 112, the synthetic processing section 113, the compression coding section 114, the Records Department 315, and the input section 618, and was shown in the 6th operation gestalt It enables it to record the signal which inputted the camera selection signal also into the Records Department 315, and was inputted at the Records Department 315 as incidental information.

[0057] The combination of an input signal can be checked without processing the recorded coded signal by this configuration.

[0058] The block diagram of the image processing system in the gestalt of

operation of the 9th of this invention is shown in drawing 10 . The image processing system of the gestalt of this operation is equipped with the camera change-over section 109, the division processing section 110, the synchronizing signal generating section 111, the data-smoothing section 112, the synthetic processing section 113, the compression coding section 114, the network interface section 416, and the input section 618, inputs a camera selection signal also into the network interface section 416 in the image processing system shown in the 7th operation gestalt, and enables it to transmit the information apart from a coded signal, as shown in drawing 10 .

[0059] The combination of the input signal under transmission can be checked by this configuration, without processing a coded signal. Furthermore, only a coded signal including an input signal to transmit because the network interface section 416 uses incidental information can be transmitted with incidental information.

[0060] The block diagram of the image processing system in the gestalt of operation of the 10th of this invention is shown in drawing 11 . The image processing system of the gestalt of this operation is an image processing system for reproducing the signal encoded with the image processing system in the

gestalt of the 1st operation, the gestalt of the 2nd operation, or the gestalt of the 3rd operation.

[0061] As shown in drawing 11 , the image processing system of the gestalt of this operation is equipped with the Records Department 315, the decode section 1001, the separation processing section 1002, the reverse data-smoothing section 1003, and the restoration processing section 1004.

[0062] The Records Department 315 is the same as the Records Department 315 of the 2nd operation gestalt. Expanding decode is carried out by the MPEG expanding method by the decode section 1001, and the coded signal read from the Records Department 315 turns into a picture signal, and is outputted to the separation processing section 1002.

[0063] The separation processing section 1002 performs reverse processing of the synthetic processing section 113 shown in drawing 1 . The separation processing section 1002 separates the image of each frame (or field), and the original image arranges the same thing in order, and outputs it to the reverse data-smoothing section 1002. Inverse transformation of the reverse data-smoothing section 1003 is carried out using the inverse matrix of a matrix used in the data-smoothing section 112 shown in drawing 1 , it restores the high

frequency component of an image, and outputs it to the restoration processing section 1004. In the reverse procedure of the division processing section 110 shown in drawing 1 , the restoration processing section 1004 has returned the list of a pixel so that it may become the original order of a pixel line number, or a pixel numerical order, and it outputs an image.

[0064] What is necessary is just to transpose said Records Department 315 to the network interface section 416, in order to reproduce the signal encoded with the image processing system shown in the gestalt of the 3rd operation.

[0065] An example of reverse data smoothing of the image processing system shown in data smoothing of the image processing system shown in the gestalt of the 1st operation and the gestalt of the 10th operation is explained referring to drawing 12 .

[0066] Data smoothing divides the field of an input picture signal into the block of 4x4 first at the appearance which is not mixed with another subsample image. Data smoothing by the smooth matrix is applied to length and a longitudinal direction in this block unit. It is [0067] when the frequency response function by this smooth matrix is set to H (omega). Since it is H(omega) ** (2+2cosomega)/4, it turns out that the high frequency component of the image within a block is

oppressed. In reverse data smoothing, a screen is divided into a block like data smoothing, and a reverse smooth matrix is applied to length and a longitudinal direction. Since a smooth matrix and the reverse smooth product of matrices serve as a unit matrix, they can restore a signal.

[0068] Therefore, since the energy of a high frequency component is oppressed by data smoothing and the energy of a picture signal concentrates on low frequency by it, it is compressible to the smaller amount of signs to the signal which is not oppressed.

[0069] The block diagram of the image processing system in the gestalt of operation of the 11th of this invention is shown in drawing 13 . The image processing system of the gestalt of this operation is an image processing system for reproducing the signal encoded with the image processing system in the gestalt of the 4th operation.

[0070] As shown in drawing 13 , the image processing system of the gestalt of this operation is equipped with the Records Department 315, the decode section 1001, the separation processing section 1002, the reverse data-smoothing section 1003, the restoration processing section 1004, and the amendment return section 1305, the Records Department 315 - the restoration processing

section 1004 are the same as that of the operation gestalt of the above 10th, and the amendment return section 1305 is added between the reverse data-smoothing section 1003 of the image processing system shown in drawing 11 , and the restoration processing section 1004.

[0071] The amendment return section 1305 performs processing returned in the same sample location as the input of the pixel amendment section 517 of the image processing system in the 4th operation gestalt by filtering by interpolation, and outputs the signal outputted from the reverse data-smoothing section 1003 to the restoration processing section 1004.

[0072] The block diagram of the image processing system in the gestalt of operation of the 12th of this invention is shown in drawing 14 . The image processing system of the gestalt of this operation is an image processing system for reproducing the signal encoded with the image processing system in the gestalt of the 5th operation, the gestalt of the 6th operation, or the gestalt of the 7th operation.

[0073] As shown in drawing 14 , the image processing system of the gestalt of this operation is equipped with the Records Department 315, the decode section 1001, the separation processing section 1002, the reverse data-smoothing

section 1003, the restoration processing section 1004, the output section 1406, and a display 1407, and adds the output section 1406 and a display 1407 to the configuration of the image processing system shown in the operation gestalt of the above 11th.

[0074] The separation processing section 1002, the reverse data-smoothing section 1003, and the restoration processing section 1004 are the same as that of the image processing system shown in the 11th operation gestalt.

[0075] The coded signal read from the Records Department 315 extracts the control signal 1408 which goes into the decode section 1001, and is multiplexed while expanding decode is carried out. The output section 1406 identifies the picture signal inputted from the restoration processing section 1004 with a control signal 1408, and outputs the picture signal specified with the selection signal 1409 inputted from the outside.

[0076] By this configuration, by using a control signal 1408, even when the combination of the picture signal encoded is irregular, the information on a specific camera can be outputted to a monitor.

[0077] Moreover, this image processing system inputs a control signal 1408 and a selection signal 1409 into the separation processing section 1002, and the

same effectiveness is acquired even if it chooses a picture signal in the separation processing section 1002.

[0078] The block diagram of the image processing system in the gestalt of operation of the 13th of this invention is shown in drawing 15 . The image processing system of the gestalt of this operation is an image processing system for reproducing the signal encoded with the image processing system in the gestalt of the 8th operation.

[0079] As shown in drawing 15 , the image processing system of the gestalt of this operation is equipped with the Records Department 315, the decode section 1001, the separation processing section 1002, the reverse data-smoothing section 1003, the restoration processing section 1004, the output section 1406, and a display 1407, and since it has the composition that the selection signal 1409 from the outside was outputted to the image processing system shown in the operation gestalt of the above 12th also at the Records Department 315, only this part is explained.

[0080] The Records Department 315 reads the coded signal containing the image specified with the selection signal 1409 from the incidental information currently recorded, and outputs to the decode section 1001.

[0081] The increase in efficiency of processing can be attained by being able to identify the contents of the coded signal, without performing expanding decode processing of a coded signal by using incidental information, and reading only a required coded signal from the Records Department 315 by this configuration.

[0082] The block diagram of the image processing system in the gestalt of operation of the 14th of this invention is shown in drawing 16 . The image processing system of the gestalt of this operation is an image processing system for reproducing the signal encoded with the image processing system in the gestalt of the 9th operation.

[0083] As shown in drawing 16 , the image processing system of the gestalt of this operation is equipped with the network interface section 416, the decode section 1001, the separation processing section 1002, the reverse data-smoothing section 1003, the restoration processing section 1004, the output section 1406, and a display 1407, and transposes them to the network interface section 416 of the image processing system which showed the Records Department 315 of the image processing system shown in the operation gestalt of the above 13th to the 3rd operation gestalt.

[0084] The network interface section 416 can distinguish and incorporate the

coded signal containing the image specified with the selection signal 1409 from the incidental information transmitted.

[0085] By this configuration, from the incidental information currently transmitted in the remote place, a coded signal including said specific input signal can be extracted, and it can reproduce. Furthermore, even when an error occurs to the incidental information under transmission, a specific input signal can be checked with the control signal by which a coded signal is contained.

[0086]

[Effect of the Invention] By this invention's dividing a frame or a field image by subsampling, using it as two or more frames or field images, and applying a frequency band limit by data smoothing after division processing, as explained above Even if it is a picture signal without inter-frame correlation of the inputted picture signal, spatial correlation is transposed to correlation between a frame or the fields. Functionality can be given and data smoothing can restrict high frequency component energy further. It can high-compress by inter-frame compression of an MPEG compression method etc., and the image processing system which has the outstanding effectiveness that prolonged record is also realizable can be offered.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The block diagram showing the image processing system of the gestalt of operation of the 1st of this invention

[Drawing 2] The approximate line Fig. for explaining the division composition approach of this invention

[Drawing 3] The block diagram showing the image processing system of the gestalt of operation of the 2nd of this invention

[Drawing 4] The block diagram showing the image processing system of the gestalt of operation of the 3rd of this invention

[Drawing 5] The block diagram showing the image processing system of the gestalt of operation of the 4th of this invention

[Drawing 6] The block diagram showing the image processing system of the gestalt of operation of the 5th of this invention

[Drawing 7] The block diagram showing the image processing system of the gestalt of operation of the 6th of this invention

[Drawing 8] The block diagram showing the image processing system of the gestalt of operation of the 7th of this invention

[Drawing 9] The block diagram showing the image processing system of the gestalt of operation of the 8th of this invention

[Drawing 10] The block diagram showing the image processing system of the gestalt of operation of the 9th of this invention

[Drawing 11] The block diagram showing the image processing system of the gestalt of operation of the 10th of this invention

[Drawing 12] The approximate line Fig. showing an example of the data-smoothing approach of this invention, and the reverse data-smoothing approach

[Drawing 13] The block diagram showing the image processing system of the gestalt of operation of the 11th of this invention

[Drawing 14] The block diagram showing the image processing system of the gestalt of operation of the 12th of this invention

[Drawing 15] The block diagram showing the image processing system of the gestalt of operation of the 13th of this invention

[Drawing 16] The block diagram showing the image processing system of the gestalt of operation of the 14th of this invention

[Drawing 17] The outline block diagram of the conventional image monitor record regenerative apparatus

[Description of Notations]

101-108 Camera

109 Camera Change-over Section

110 Division Processing Section

111 Synchronizing Signal Generating Section

112 Data-Smoothing Section

113 Synthetic Processing Section

114 Compression Coding Section

315 Records Department

416 Network Interface Section

517 Pixel Amendment Section

618 Input Section

1001 Decode Section

1002 Separation Processing Section

1003 Reverse Data-Smoothing Section

1004 Restoration Processing Section

1305 Amendment Return Section

1406 Output Section

1407 Display

1408 Control Signal

1409 Selection Signal

1701-1704 Camera

1705 Camera Change-over Section

1706 Compression Coding Section

1707 Synchronizing Signal Generating Section

1710 Expanding Decode Section

1711 Output Section

1712 Synchronizing Signal Generating Section

1713 Display